

We Claim:

1. A pulmonary liquid or dry formulation comprising a GLP-1 compound whereto is attached a lipophilic substituent optionally via a spacer.

2. The pulmonary formulation of claim 1 wherein said GLP-1 compound is exendin or an analog thereof or a GLP-1 analogue.

3. The pulmonary formulation of claim 2 wherein said GLP-1 compound is exendin-3, exendin-4 or Arg³⁴-GLP-1(7-37)-OH.

4. The pulmonary formulation of any one of claims 1-3 wherein said lipophilic substituent comprises 4-40 carbon atoms.

5. The pulmonary formulation of any one of claims 1-4 wherein said lipophilic substituent is hexadecanoyl.

6. The pulmonary formulation of any one of claims 1-5 wherein a spacer is present.

7. The pulmonary formulation of claim 6 wherein said spacer is γ -Glu or β -Ala.

8. The pulmonary formulation of claim 1 wherein said GLP-1 compound whereto is attached a lipophilic substituent via a spacer is Arg³⁴Lys²⁶(N^ε-(γ -glutamyl(N^α-hexadecanoyl)))-GLP-1(7-37)-OH, Arg¹⁸, Leu²⁰, Gln³⁴, Lys³³(N^ε-(γ -aminobutyroyl(N^α-hexadecanoyl))) Exendin-4-(7-45)-NH₂ or Arg³³, Leu²⁰, Gln³⁴, Lys¹⁸(N^ε-(γ -aminobutyroyl(N^α-hexadecanoyl))) Exendin-4-(7-45)-NH₂.

9. A pulmonary delivery device comprising a formulation according to any one of claims 1-8.

10. A pulmonary delivery device comprising a GLP-1 compound whereto is attached a lipophilic substituent optionally via a spacer.

11. A method for preparing a pulmonary liquid or dry formulation for use in a pulmonary device, said formulation comprising a GLP-1 compound whereto is attached a lipophilic substituent optionally via a spacer.

12. A method for preparing a pulmonary delivery device, said device comprising a GLP-1 compound where to is attached a lipophilic substituent optionally via a spacer.

13. A method of reducing blood glucose levels, treating diabetes type I, diabetes type II, or obesity, or inhibiting gastric acid secretion, or inhibiting apoptosis of β -cells, comprising administering to a patient in need thereof an effective amount of a GLP-1 compound where to is attached a lipophilic substituent optionally via a spacer by inhalation so as to deposit said GLP-1 compound where to is attached a lipophilic substituent optionally via a spacer in the lungs of the patient.

14. Use of a GLP-1 compound where to is attached a lipophilic substituent optionally via a spacer for the preparation of a pulmonary delivery device for reducing blood glucose levels, treating diabetes type I, diabetes type II, obesity, gastric ulcers, or for inhibition of apoptosis of β -cells.

15. The use according to claim 14, wherein said GLP-1 compound where to is attached a lipophilic substituent optionally via a spacer is Arg³⁴Lys²⁶(N^ε-(γ -glutamyl(N^α-hexadecanoyl)))-GLP-1(7-37)-OH.